

Partnering for food security and sustainable livelihoods in marginal environments



Dr. Tarifa Alzaabi
Acting Director General
International Center for Biosaline Agriculture (ICBA)
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Challenges to food security and livelihoods in marginal environments



Key challenges in marginal environments



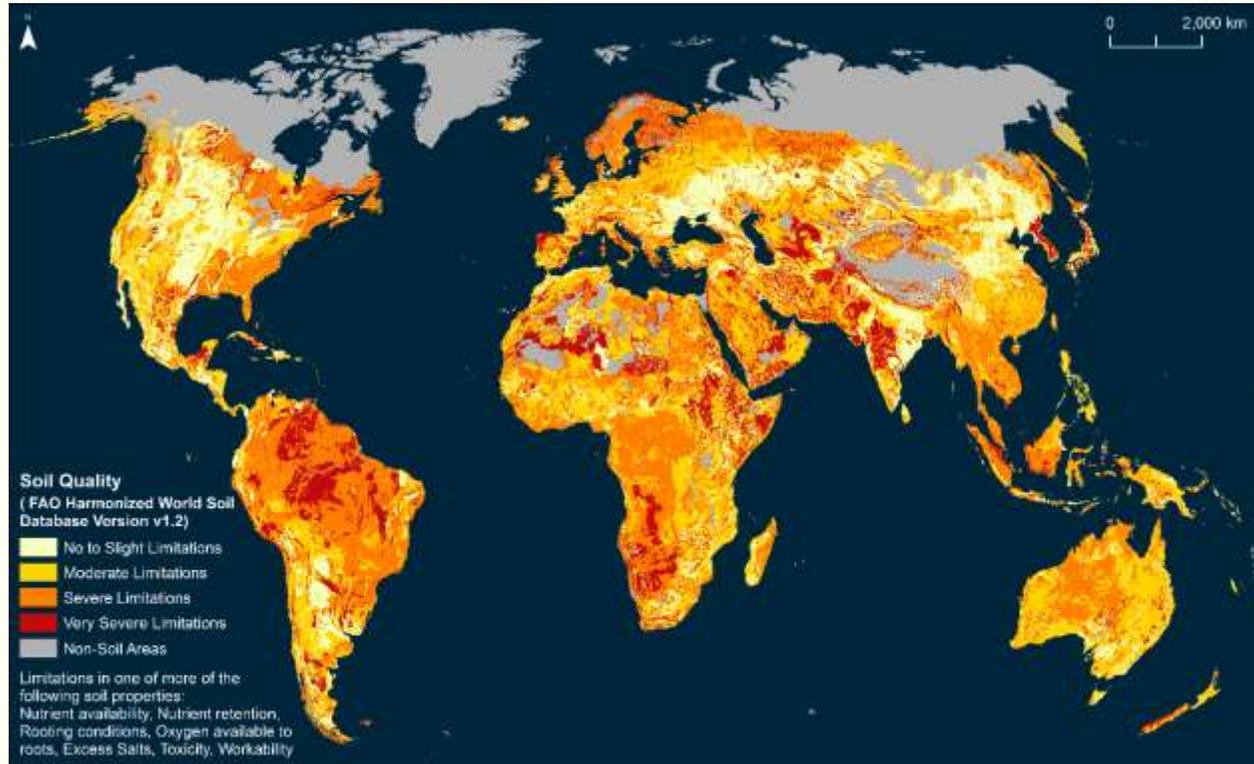
About **21% (2.74 billion ha)** of all land resources (13.5 billion ha) are marginal (water scarcity, land degradation)

Some **1.128 billion ha** are affected by salinity globally

Climate change will hit communities hardest in marginal regions

Most of **more than 820 million** undernourished people live in marginal areas

Marginal lands



Cost of salinization:

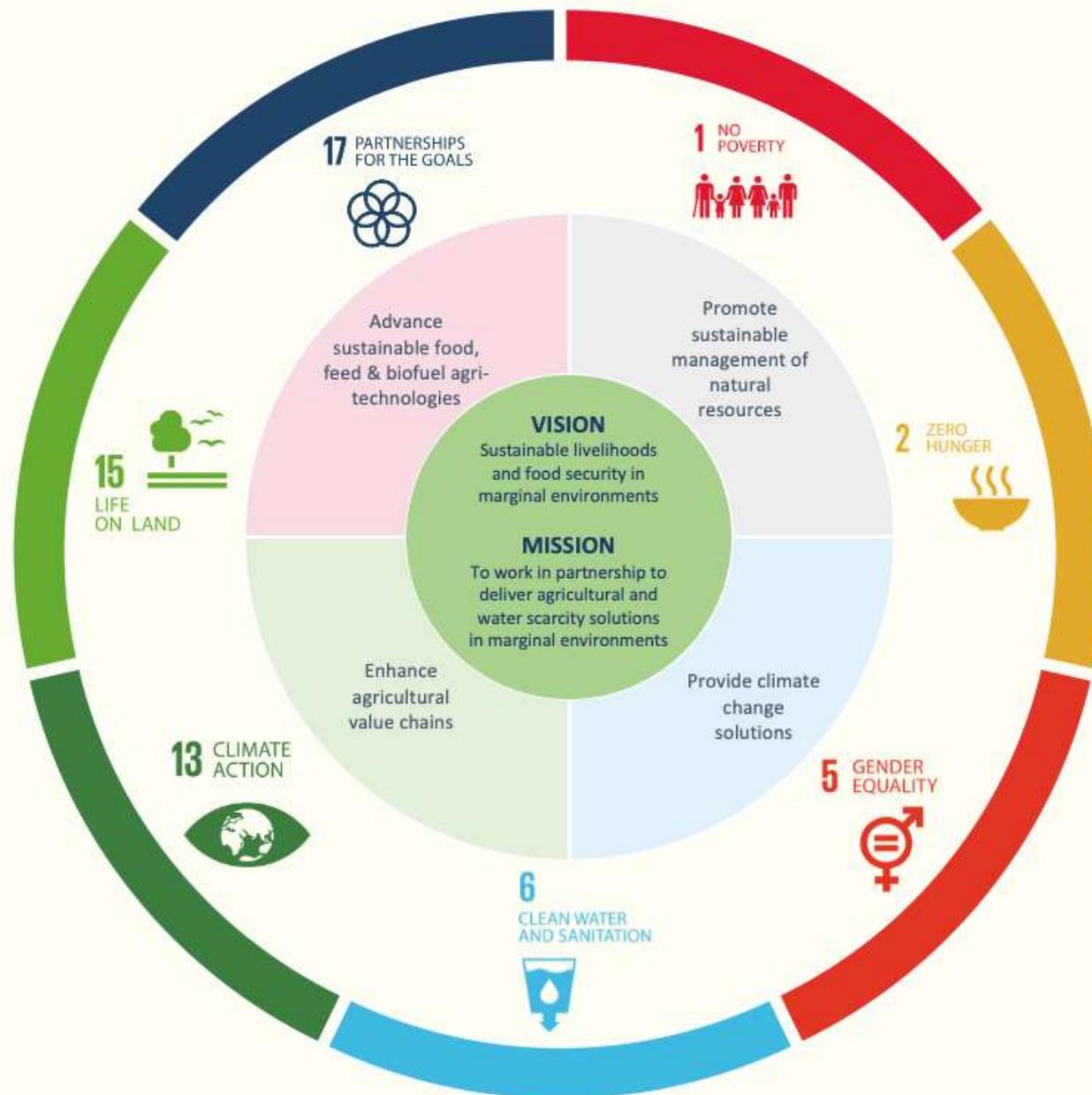
About **27.3 billion USD** because of lost crop production only

Some **310 million ha** of irrigated areas in arid and semi-arid regions

ICBA's contributions to SDGs



ICBA's vision and mission



1 NO POVERTY





Fodder, dairy and
quinoa value chains
in Egypt



- Quinoa value chains in Morocco

2 ZERO HUNGER





Genome-wide association studies in quinoa

- **190 genotypes** of quinoa
- Collaboration with the **Max Planck Institute**, Germany, and the **BGI Group**



Diverse and nutritious
resilient crops

- Cumin; buckwheat; proso millet; finger millet; foxtail millet; fonio



Foods of the future

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GENDER
EQUALITY

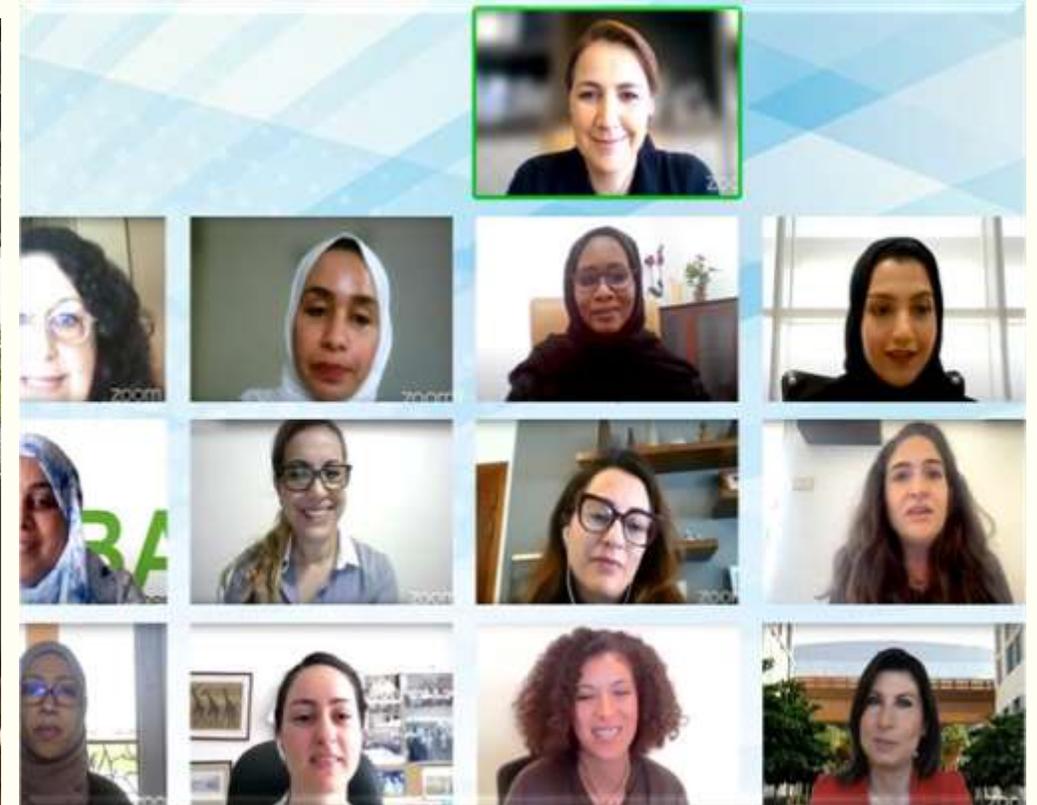


Arab Women Leaders in Agriculture (AWLA) 2021-22

Launched on 8 March 2021 (International Women's Day)



Arab Women Leaders
in Agriculture



To launch later:

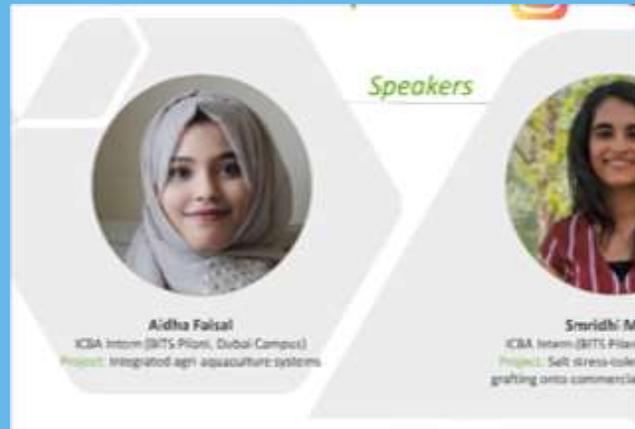
- AWLA for Africa
- AWLA for Central Asia





Youth Engagement Society – ICBA YES

- **Vision:** Establish a global Youth Engagement Society to be a catalyst for innovative solutions to global food security, agricultural productivity and sustainability in marginal and saline environments.



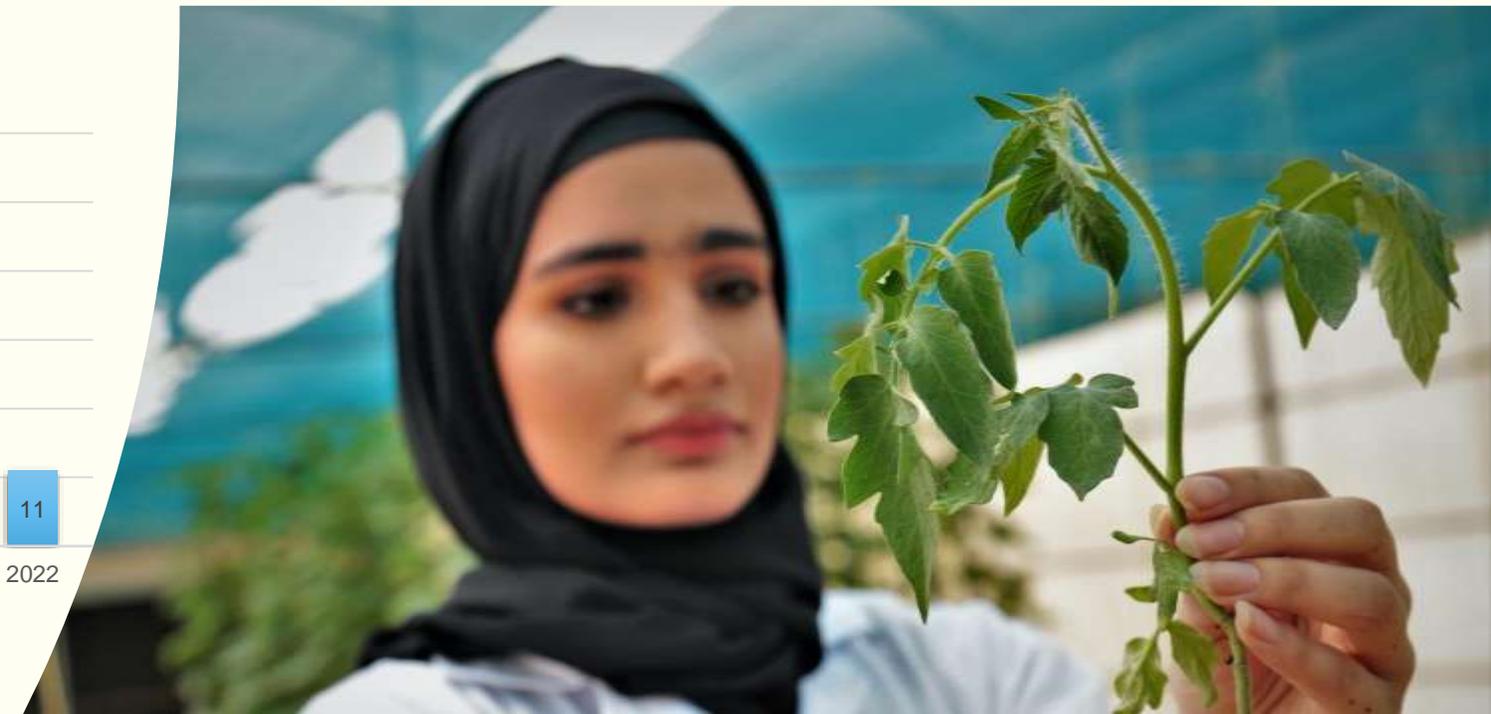
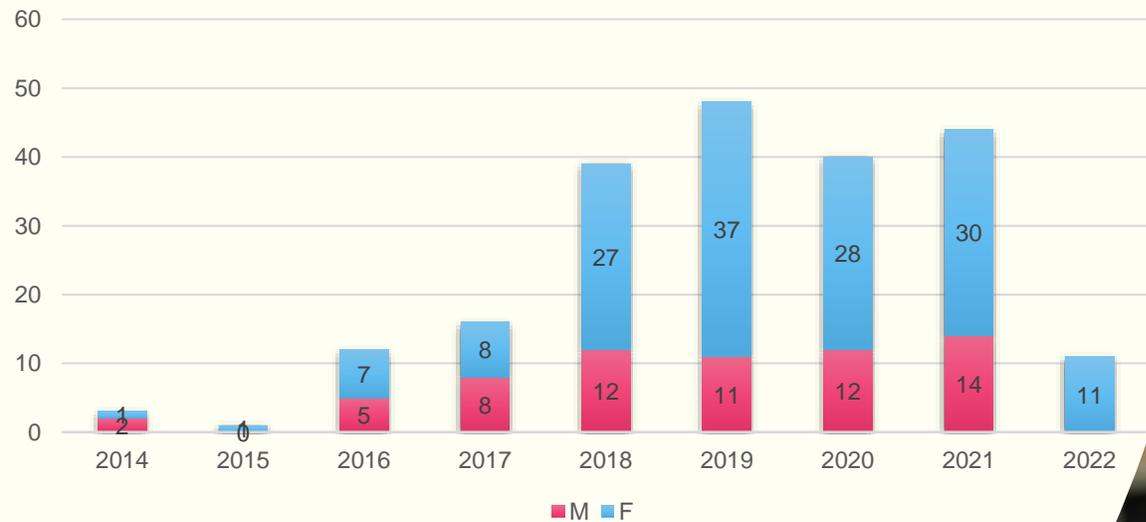
- **Mission: INSPIRE** youth to **CONNECT** locally and internationally to make innovative impact with the focus on **BIODIVERSITY** and **AGRIPRENEURSHIP**

Internships

214 interns from **26** countries and **40** universities



Interns by Year and Gender

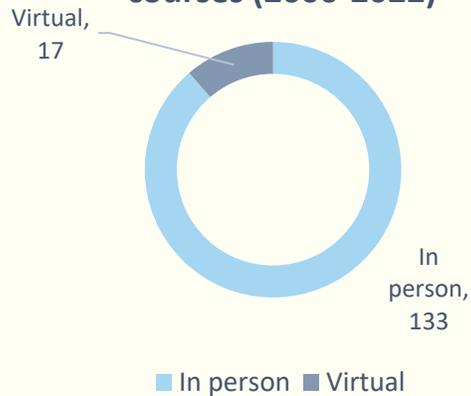


Capacity development statistics

Around **9,200** participants in various capacity development programs

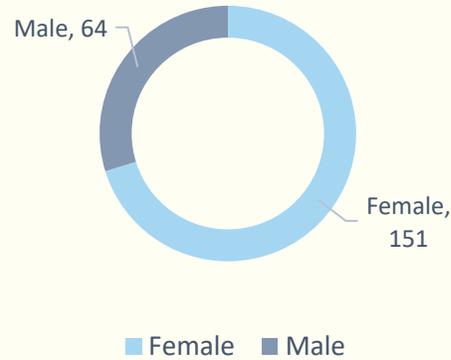
Beneficiaries from **93** countries

Number of technical training courses (2000-2022)

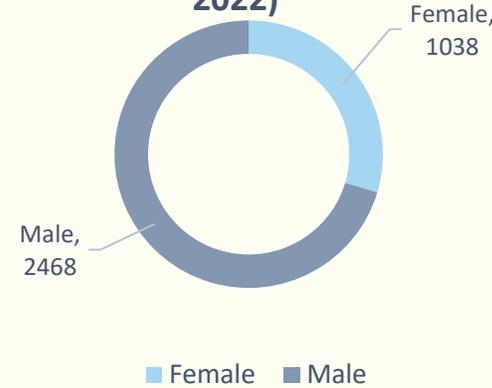


Virtual started in 2020

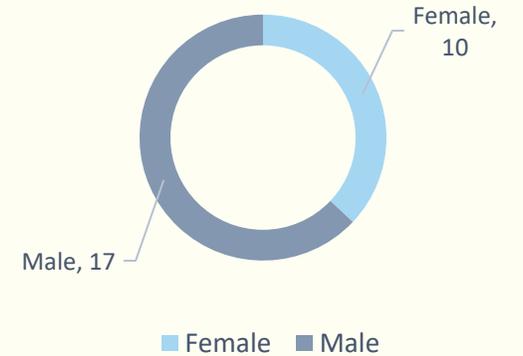
Interns (2014-2022)



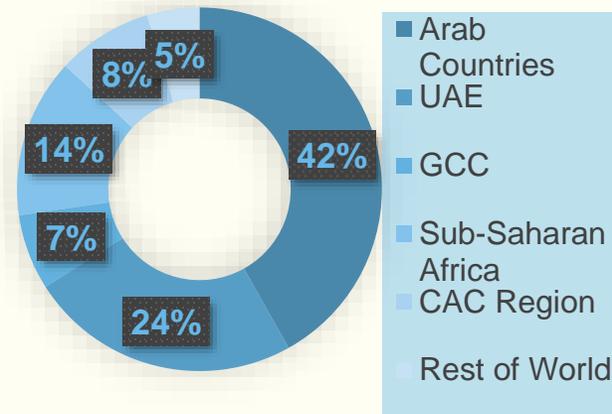
Technical training (1999-2022)



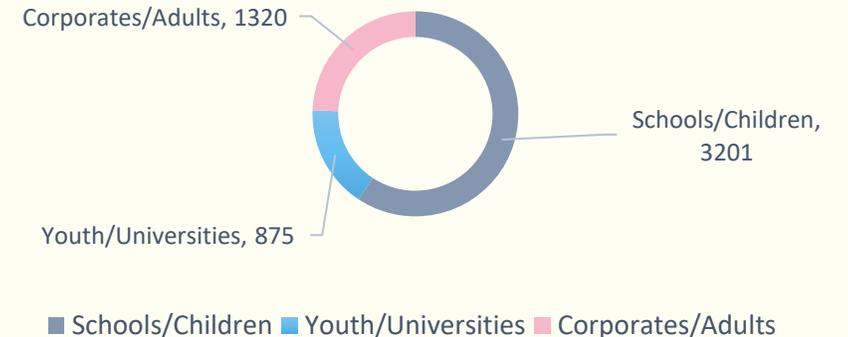
Post-doc fellows (2010-2022)



ICBA Capacity Development by Country/Region



Capacity development at ESM (2017-2021)



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CLEAN WATER
AND SANITATION





Improved water use efficiency

- ICBA has introduced small-scale irrigation in Burkina Faso, The Gambia, Mali, Mauritania, Niger, Nigeria, and Senegal
- ICBA has promoted water innovation technologies in Jordan, Oman, Tunisia, Yemen, and the UAE

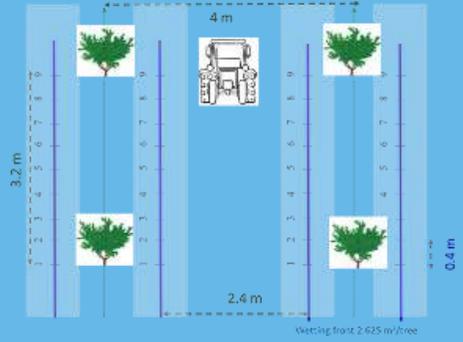


Solar-powered small-scale irrigation systems

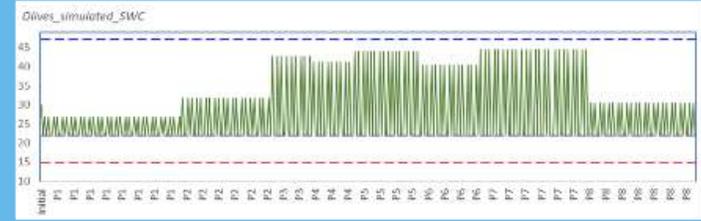
- Demonstrate improvements in farming systems
- Develop required value chains for job creation and development
- Utilize low-carbon technologies (climate compatible development)



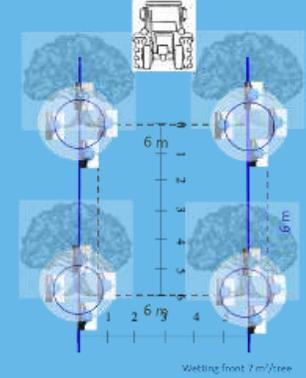
Peach Planting (example 3.2 x 4 m) and Irrigation Layout (humid band with possibly raised-bed)



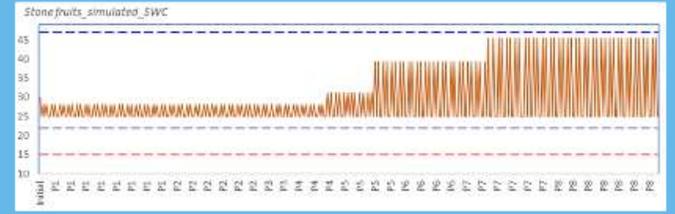
Lateral shallow root system
 Eta_canopy_pic=6.5 mm with fraction wetting of 19.3%, and fraction cover of 44%



Olives Planting (6 x 6 m) and Irrigation Layout (double basin)



Lateral deep root system
 Eta_canopy_pic=4.5 mm with ground fraction wetting of 19.1%, and fraction cover of 35%



Dominant Leptosols (LP).
 Loamy with bulk density of 1.35, 20-40% gravel, calcium carbonate 26-35% (pH=8.1), gypsum 0.7-2.4; salinity 2.5 dS/m.
 Simulation of variation in SWC by volume for 20 cm layer in the upper soil layer.

Water innovation technologies in Jordan

- Irrigation layout and scheduling for olive and peach trees in Azraq and Mafraq governorates

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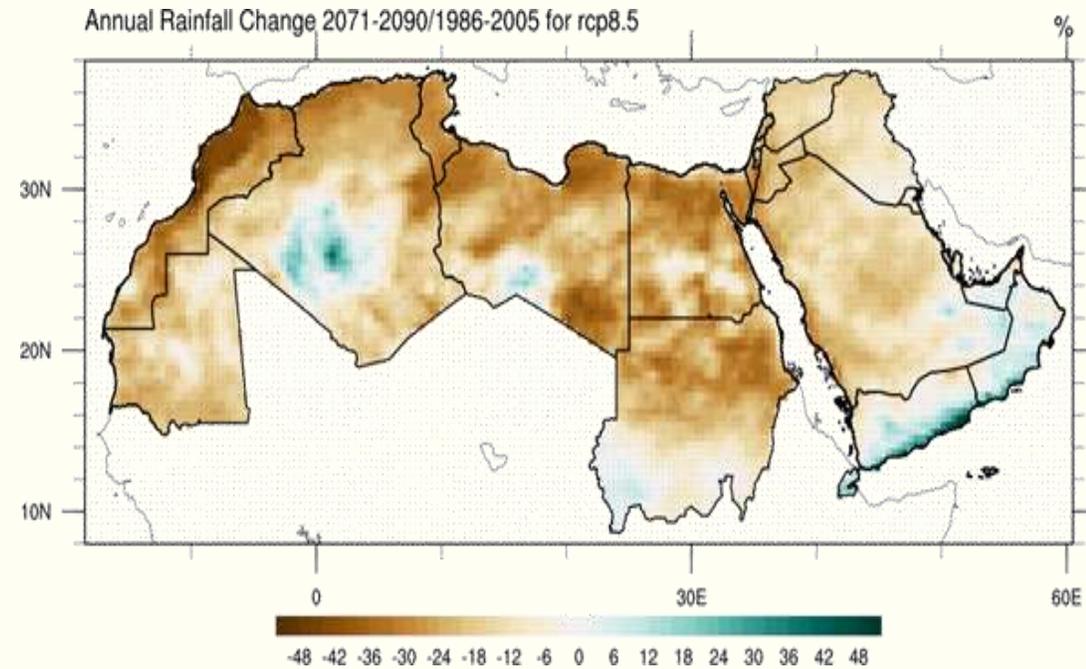
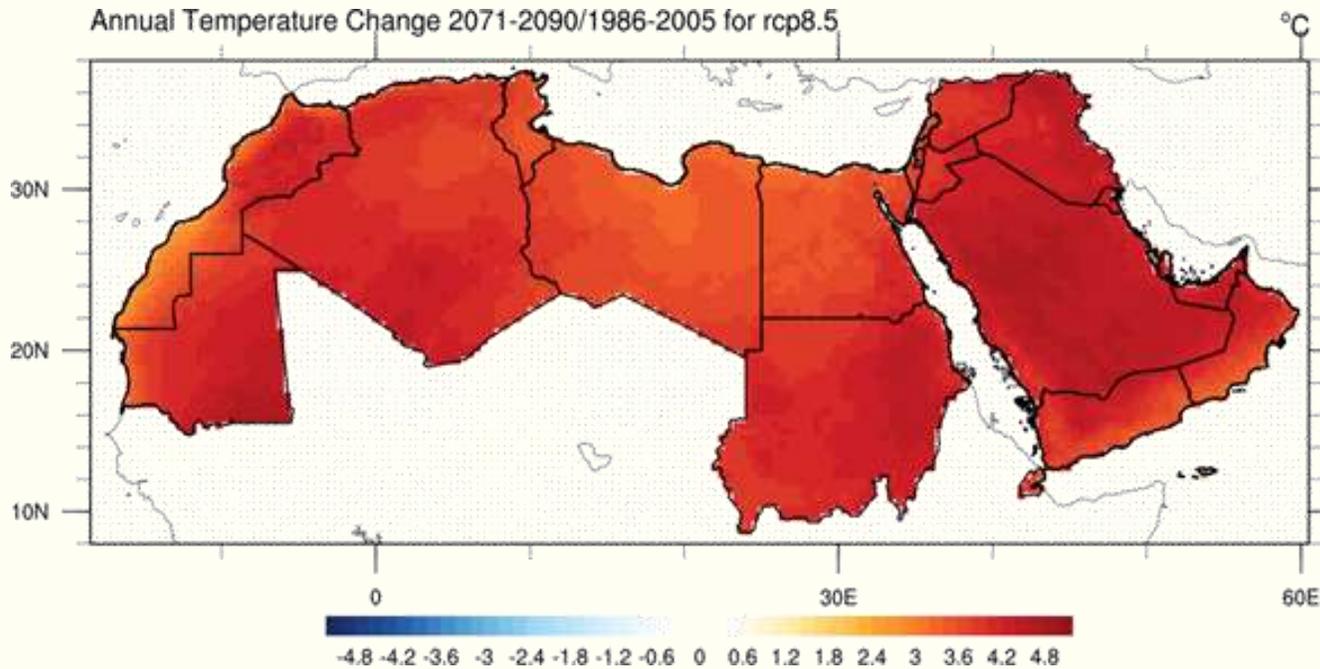
**CLIMATE
ACTION**



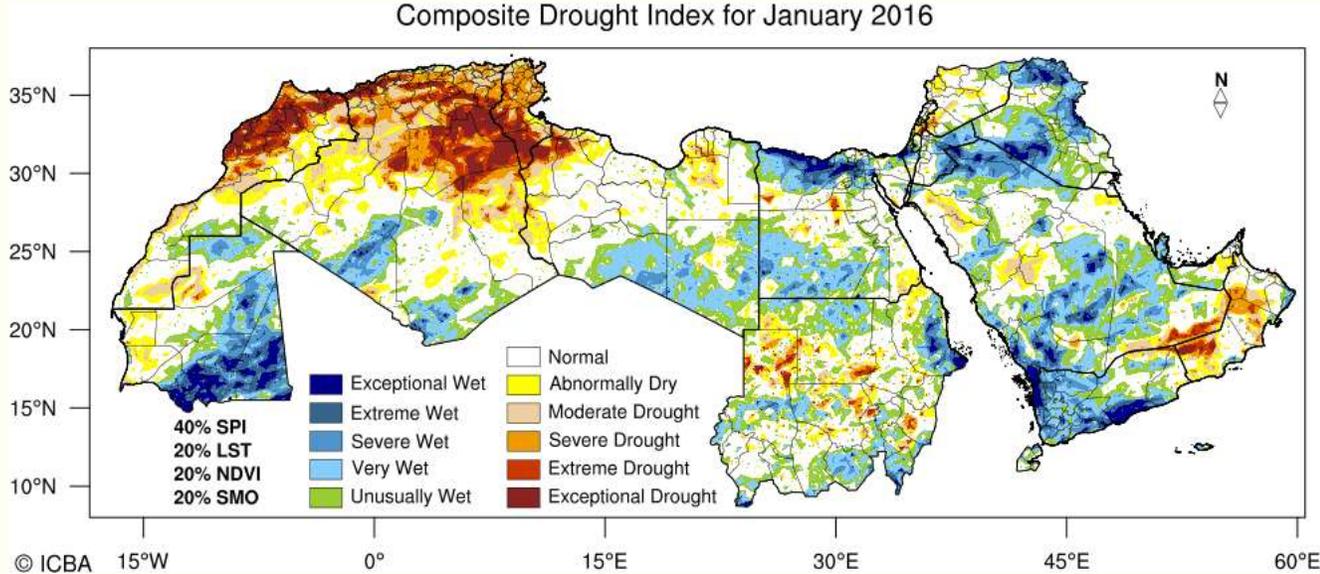
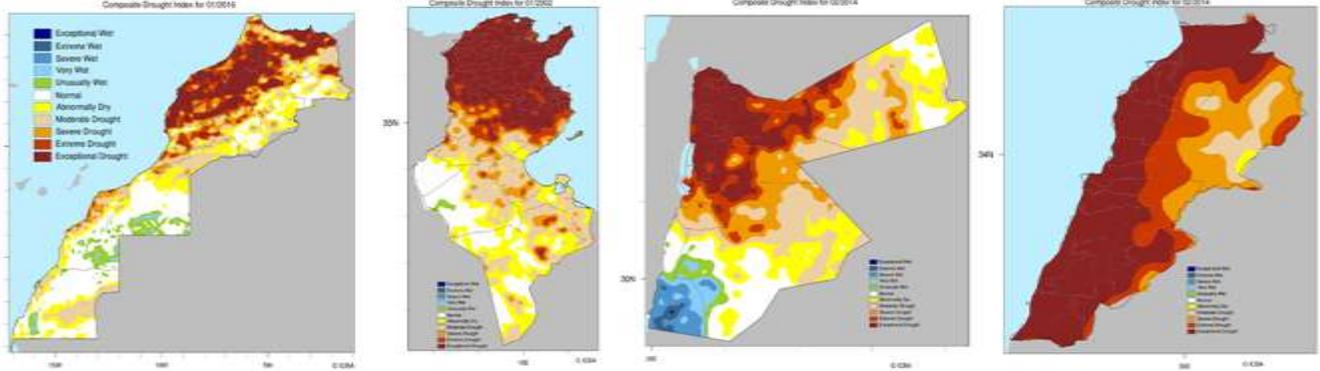
Climate change modeling

Future changes 2071-2090 vs 1986-2005 for RCP8.5 scenario

MENA is one of the regions that is likely to be seriously affected by climate change

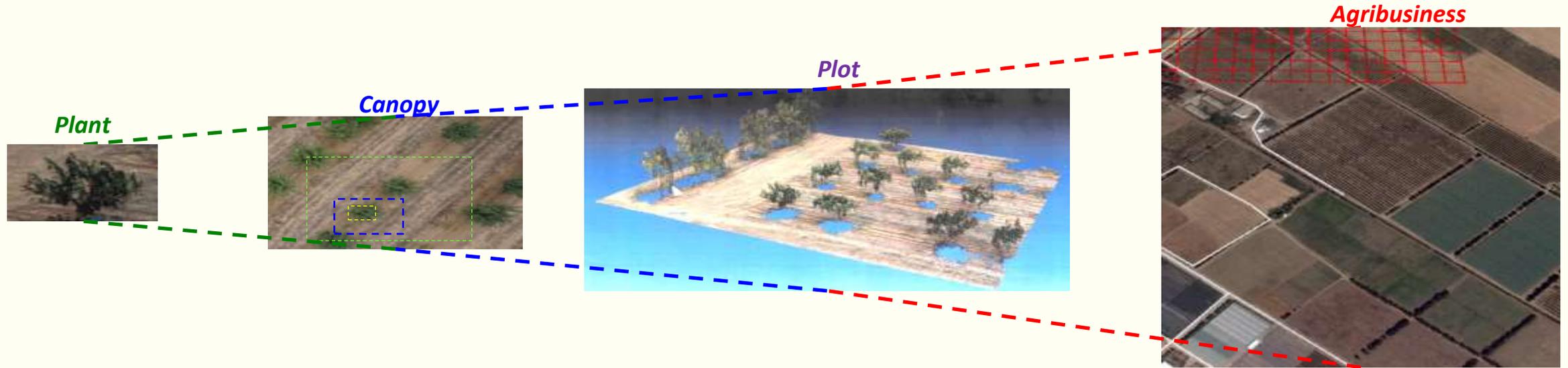


Drought management in MENA



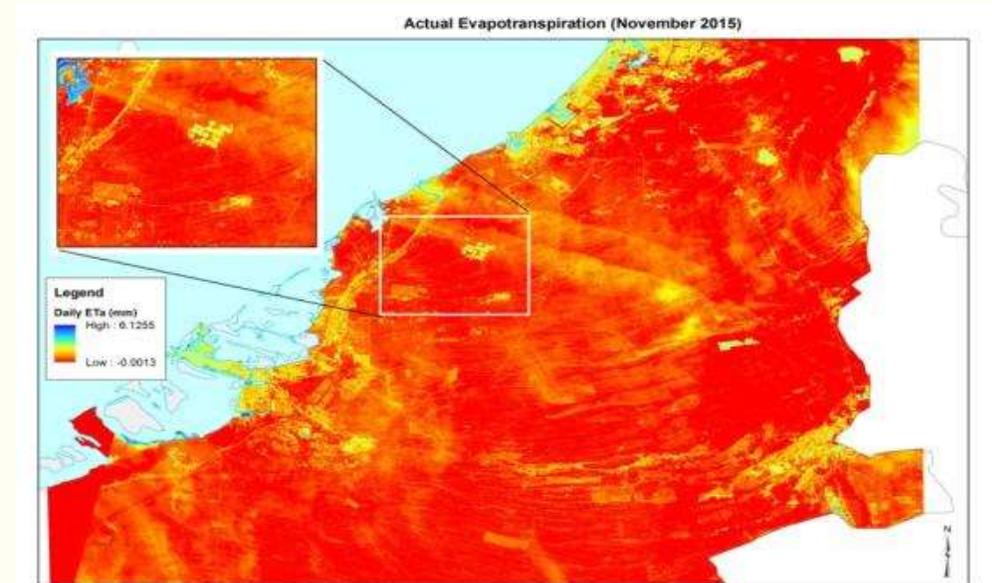
New drought monitoring and management systems in Morocco, Tunisia, Jordan, Lebanon

Climate change adaptation



Climate-smart water management

Quantifying current and future water use and requirements through modeling and sensor/drone/satellite imagery to support water adaptation strategies and allocations



Climate-smart agriculture in Uzbekistan



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LIFE
ON LAND



Agrobiodiversity

Agricultural biodiversity

is fundamental for coping with changing climate and securing our future of food



400,000 plant species

identified on the planet



30,000
known
to be edible



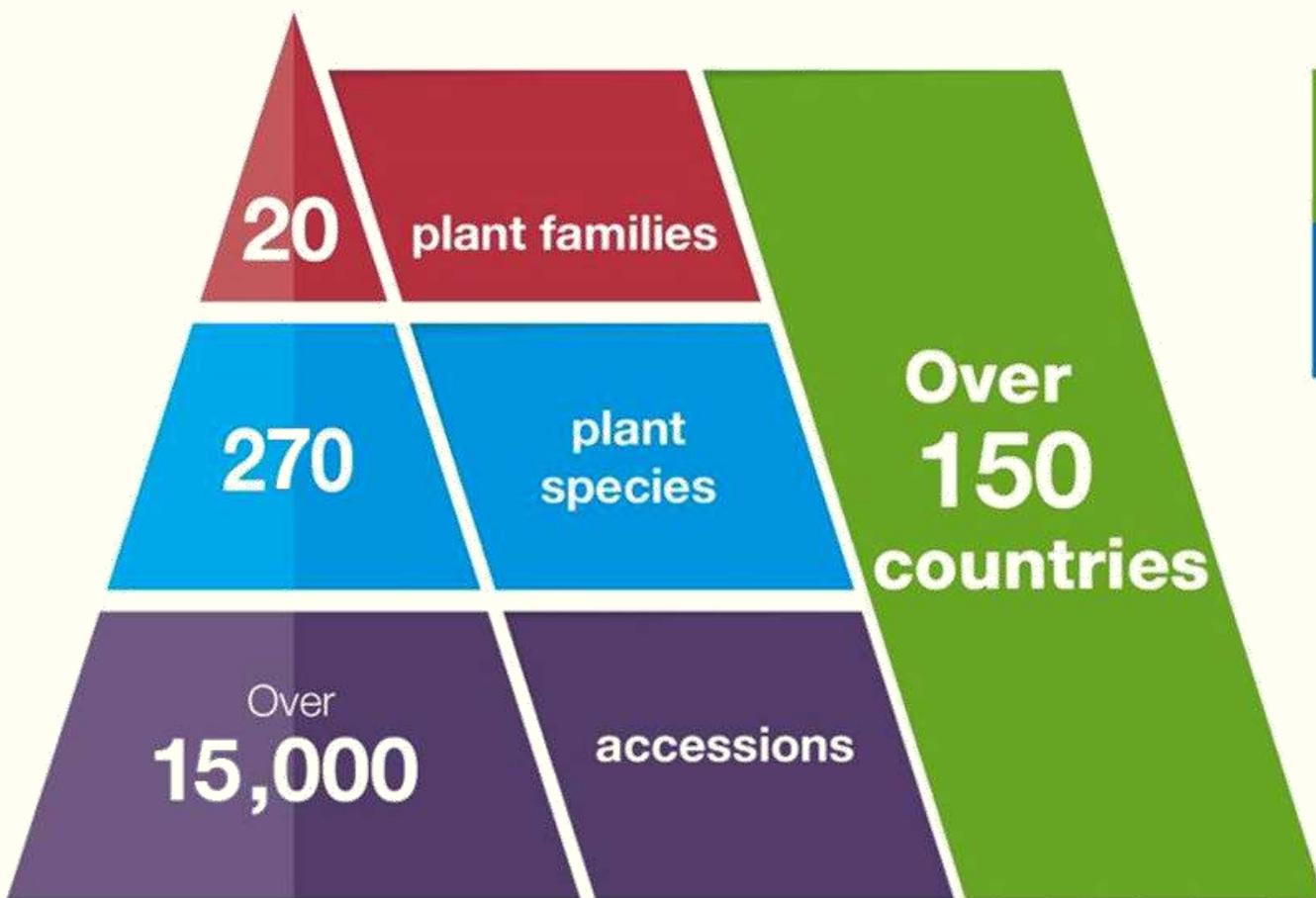
only 6,000
used
as food

150 crops are cultivated on significant scale worldwide



only 3 crops
maize, wheat and rice
supply nearly **60%** of our
daily protein and calories

ICBA's genebank



Temperature: 4°C
Relative humidity: 30-40%



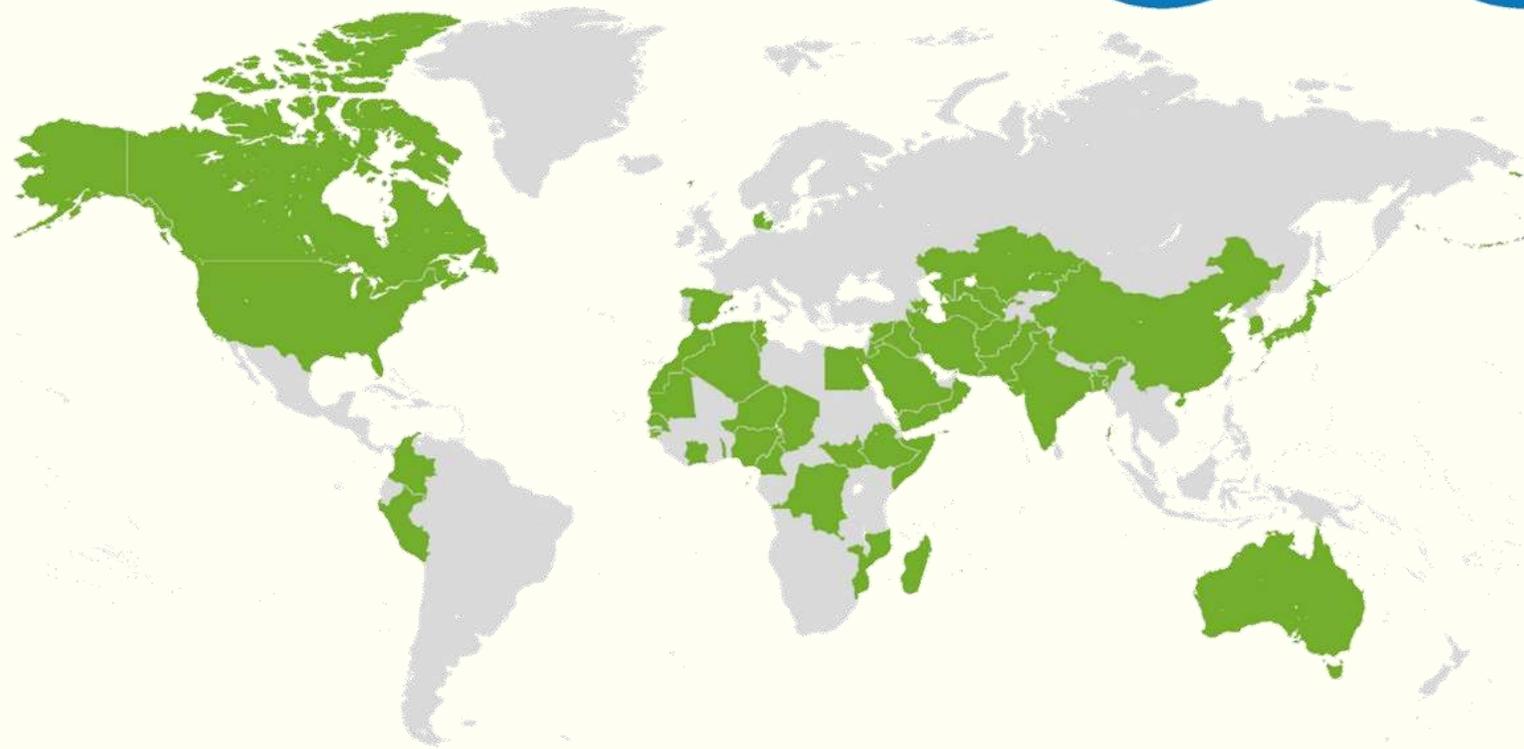
270 accessions of wild and cultivated plant species from UAE

70 plant species



Germplasm distribution

Seed Distribution by ICBA
to Different Countries



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**PARTNERSHIPS
FOR THE GOALS**



ICBA's projects and programs



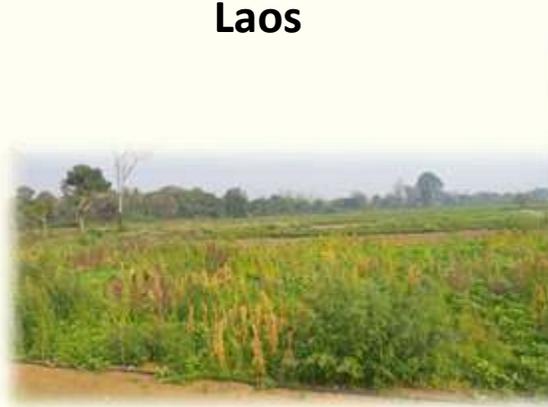
Multi-environment trials



Bhutan



Egypt



Laos



Mozambique



UAE



Togo



Tunisia



Uzbekistan

Desert Life Science Lab at ICBA

Desert Life Science Lab:

- Is an advanced genomic research facility established jointly with BGI, the world's largest genomic research organization
- Has some of the latest biotechnological equipment, including the next-generation sequencing platform (DNBSEQ-G400RS)
- Conducts whole genome re-sequencing, genotyping-by-sequencing, metagenomics, transcriptomics, small RNA sequencing and other types of research



Research and development work



Research-for-development projects and programs in **41** countries

Key takeaways

- Partnership and collaboration are key to the achievement of SDGs
- R&D and innovation are crucial for future-proofing agri-food systems
- It is important to harness the potential of youth and women for sustainable development





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